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THESIS

A HANDBOOK FOR WORK REDESIGN WITH FOCUS ON JOB ENRICHMENT AND TECHNOLOGY

by

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A Handbook for Work Redesign With Focus on Job Enrichment and Technology

by

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Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

ABSTRACT

This thesis provides the manager with a review of relevant literature and, most importantly, offers a "handbook" to guide the manager's thinking and actions in implementing work redesign.

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I. INTRODUCTION

A. GENERAL

Organizations today are encountering monetary and human costs that are associated with the disrupted production and diminished quality that stem from heightened employee/management antagonism, increased strike activity, rising rates of turnover and absenteeism. Problems such as the above were at one time primarily problems of the factory and were commonly viewed as being peculiar to the blue-collar worker. But today these problems are as common to the office as they are to the shop floor.

In the last several decades, organizations have been influenced by Technology and Automation, have increased their role in attaining organizational objectives and have dramatically expanded the number of jobs that are specialized, simplified, standardized, and routinized. Moveover, organizations have become larger and more bureaucratic in the way they function.

> During the 1940's and 1950's workers called steady work the most important thing they wanted from their jobs. A comprehensive 1957 study that summarized the extensive liaterature to date listed job factors influencing satisfaction in roughly this order: job security, opportunities for advancement, company and management, wages, and intrinsic work coming fifth. By sharp contrast, in a 1969 survey interesting work came first and job security was rated seventh, and six of the eight most desired aspects of work related to job content. [Ref. 1: p.63]

I think that simplified, routinized work is neither effective nor humane. Yet reversal is possible. Expand the job, make it challenging, manage the worker as a person rather than a machine part, and he will surprise management (and perhaps himself) with a level of motivated, productive work which he now seems incapable.

"Up to 1975 more than 3350 articles, books and dissertations have been published on the above topic" [Ref. 2]. Studies done by Brayfield and Crockett [Ref. 3]; Herzberg et.al. [Ref. 4]; Vroom [Ref. 5]; Hulin [Ref. 6]; Schuh [Ref. 7]; Weitz and Nuckols [Ref. 8]; Mikes and Hulin [Ref. 9]; Taylor and Weiss [Ref. 10]; Wild [Ref. 11]; and Mangione [Ref. 12] have established the relationship between job satisfaction and turnover.

Modern management has several methods of motivating workers at its disposal. Although implementation of specific motivational programs is not an easy task, with hard work, cooperation and communication between management and factory workers, improved motivation can be accomplished.

In 1978 Eli Ginzberg, a specialist on manpower problems made the following remarks:

> If you look at an assembly line, you have to conclude that it is boring.... Recently I spent a couple of hours at an auto plant in Sweden where they are trying to modernize the assembly operation by having groups of workers put together a complete auto. When I came out, I said to my guide, "that job, no matter how you do it, is still a lousy job." [Ref. 13]

Management has come to the realization that the assembly line is the most economical way to put together a product. Significant cost savings help to provide a competitive edge with consumers. Given its benefits, overcoming its problems is worthy of much attention. Motivational programs may provide needed solutions to the problems.

B. THE MANAGEMENT ENVIRONMENT

Management's goal is to provide a product or service of value to society in return for a profit. The manager, in order to attain this goal, works in an environment of competition for profit. Competitive strategies are constantly changing because of the changes in the demands of society and rapid technological advances. With such a state of flux, the process of management becomes essentially a large feedback control device. The reason for this is that first an objective is set or some future condition is established, and then the means by which this objective is obtained is determined.

It is within the planning function of management that objectives are set, plans are developed, and schedules established. And, it is within the control function of management that the feedback information is gathered, interpreted and reported. Related to every management function is the decision making process. Common characteristics of this process are:

1. A compulsion/initiation
2. Comprehension of the situation
3. Consideration of all relevant factors
4. Confirmation of the objectives
5. Choosing the best solution
6. Communicating this choice
7. The consequences of that choice [Ref. 14]

As organizations become more complex, managers need help in diagnosing what is going on both internally and externally. Most O.D. books put a heavy emphasis on diagnosing but few have provided workable schemes for the manager to think through the multiple diagnostic issues which face him or her. [Ref. 15]

C. OBJECTIVE

The objective of this thesis is to suggest an approach related to the "Work Redesign" with focus on job enrichment and technology as a guide to the manager, which will enable better organization decisions to be made. This is accomplished by:

1. introducing effectiveness concepts;
2. highlighting the major factors affecting the decision process, and evaluating their relative importance;
3. presenting possible trade-offs between accepting relative factors and organization's output;

4. proposing and implementing "advanced" up-to-date techniques for optimal results concerning the "Work Redesign" concentrating upon specific parts as technology and job enrichment as of past experience that at present exists.

D. METHODOLOGY

Primary research material was collected through a comprehensive search of the literature base for applicable studies and articles. Information was obtained from the library of the Naval Postgraduate School.

Secondary research material was collected through my studies at the Naval Postgraduate School and additional private discussions with professors of the Naval Postgraduate School dedicated to the subject area as well as with representatives from private industry.

E. ORGANIZATION OF THE STUDY

Chapter II is intended to give the reader some background in job enrichment and technology and how they affect their organizations in work redesign.

Chapters III and IV introduce the reader to organizational development and planned change, describing relevant methods of handling the change.

Chapter V includes a review and description of implementation methods which managers might find useful in

implementing work redesign in their organizations, giving at the same time a guide for managers to help them implement work redesign.

Chapter VI deals with the evaluation of the proposed method, recommendations and conclusions.

II. WORK DESIGN, WORKERS, AND ORGANIZATION

A. BLUE-COLLAR BLUES

Much has been written about blue-collar blues or woes in recent years [Refs. 16, 17, 18, 19, 20]. In some cases, the blue-collar blues are expressed by high rates of tardiness, absenteeism, turnover, inattention on the job, low level of worker effort, pilferage, occasional sabotage of products, deliberate waste, work stoppages, assaults, bomb threats, and other disruptions of work routines. In other cases, the blue-collar blues are expressed by anxiety, physical or emotional disabilities, family problems caused by job pressures, alcoholism and support for extremist political causes. Studies of these behaviors are undertaken to determine their causes and to prescribe possible remedies.

There are many sources of discontent and alienation with some variation from one situation to another. Discontent is concentrated more in blue-collar workers than in professional or managerial groups. The causes of discontent are many and varied but they can generally be related to the very structure of industrialism. According to Barbash [Ref. 21], the structural requirements of industrialism are:

1. Technology: Consignment of production hardware skills, science and technique.
2. Scale: Large concentrations of workers and capital investments.

3. Cost discipline: The technique for economizing on scarce resources in order to achieve an acceptable rate of return.
4. A disciplined labor force: Men and women workers who by education, culture and motivation, will be responsive to cost discipline techniques.
5. Organization: The structured association of people and procedures that is necessary for administering the technology, scale, cost discipline and labor force.
6. Uncertainty: The unpredictability of economic events.
7. The state: The overhead facilitative, regulatory, public-procurement and planning functions usually provided by the government.

Barbash concludes that these structural features generate tensions among manual workers. The nature of these structural characteristics suggests that the worker-task and worker-management interfaces may be far more complex than some managers think. Management may, of course, recognize the effects of such complexity and seek to manage more effectively.

Beach [Ref. 22] explains the growing feeling of frustration and alienation for many in the labor force as a result of the extreme division of labor, the strict discipline of

the industrial system, the lack of opportunity to be one's own boss, utilization of only a few of one's abilities, a lack of sense of task completion, and little say-so in decisions governing one's work. All of these, and more, contribute to job boredom and dissatisfaction.

1. The Results of the Michigan Study

In 1973 a study was completed by the Survey Research Center (SRC) at the University of Michigan to be used by the Department of Labor. In this study workers were asked to rank twenty-five aspects of work according to their importance. The results ranked "interesting work" as number one; "pay" was ranked fifth and "job security" was seventh on the list.

The SRC did not separate the results by occupation. The final rankings were summed in professional to unskilled labor classifications. It would seem logical that a manager would rank aspects of work differently from an unskilled factory worker. When the results are separated into categories by occupation, the findings vary drastically. Blue-collar workers rank pay and job security above interesting work. Workers in manufacturing plants ranked their needs as follows: (1) physical conditions, (2) security, (3) earnings, and (4) benefits. On this list interesting work appeared fifth [Ref. 23].

From this revised listing one can see that job enlargement is not necessarily the correct alternative to solving assembly line troubles. Before management considers redesigning a laborer's job, they must first satisfy the workers needs in regard to job security, safe and healthy working conditions, good pay and fair benefits. Only after these needs have been met should management consider redesigning jobs to create more meaningful and interesting work.

Andrisani [Ref. 24] concludes that the degree of turnover among blacks who are dissatisfied leads to a higher rate of unemployment among them than exists among comparable blacks who are more highly satisfied with their jobs. Among whites, however, a majority of dissatisfied workers are prone to unemployment irrespective of whether they have changed employers. This situation means, of course, that dissatisfied workers are less hesitant to leave a job without a new one lined up ahead of time. Since the dissatisfied individuals stand to lose less if their new jobs are not satisfactory, they face less risk in job changing than the satisfied ones.

Gooding [Ref. 16] reports that forty percent of the hourly workers in the automobile industry are under thirty-five. Younger workers tend to be more discontented than middle-aged ones, in part because they have more education

and higher expectations from work as well as life itself than do their elders. They have not been conditioned to accept the regimentation of industry as were their fathers. Therefore, they rebel by being absent and tardy more often and by establishing higher turnover rates. Thus, it seems there exists a strong and systematic relationship between job satisfaction and subsequent turnover throughout the economy. The relationship is so strong, in fact, that it can be captured even by very straightforward measures of employee attitudes.

B. JOB ENLARGEMENT

What is it? To summarize enlargement is "the technique of logical grouping of human work elements previously performed by more than one person into a new single task which attains the work objectives more effectively than the individually performed elements." [Ref. 25] Although not totally new, it is one of the newer tools used by management in an attempt to solve problems on the assembly line. Repetitive tasks often cause discontent among blue-collar workers. The solution to this discontent could quite possibly be the redesign of that work to form more meaningful jobs.

On the present assembly line, the speed is governed by the worker with the longest cycle time. Although management sets the standards to be met by the assembly-line, the

workers can still control the speed they work. The speed of the line is the time of the slowest worker's average cycle. All the others along the line have slack time created by the slowest worker. No matter how well a line is balanced, it will still create slack time. This idle time is usually not observed by management because a worker learns to pace himself according to the standards and speed of the line, a practice known as Parkinson's Law. The true minimum total cycle time is found by multiplying the average time of the highest cycle by the number of people involved.

Modular assembly work could be the answer to worker boredom, high reject rates, and the inflexibility of the line. In modular assembly, the work elements are combined into a single job. The importance of this aspect is the independence of the worker. Since the worker is not dependent on other times, he is free to work at his own speed. His shorter element times will cancel his longer element times, resulting in a shorter cycle time. In this manner, he can allow himself more time if difficulties arise. If he finishes before his average, he can go on to the next element without any slack time. The time for the cycle is simply the sum of the average element time:

$$A_T = A_1 + A_2 + A_3 + \ldots + A_n,$$

where A_T = Total allowed time and A_n = Average normal element time.

This simple application shows that job enlargement can be a tool for cost reduction. The total cycle time will be less in the enlarged job than with the old assembly line method. It should be noted at this point that job creation is secondary in itself to the creation of good, potentially rewarding work [Ref. 26].

1. Advantages and Limitations

There are advantages and limitations to redesigning the assembly line. Some of the advantages are obvious: (1) it reduces labor costs without much resistance from the workers, (2) it emphasizes worker identification with the finished products, (3) it provides the needed tracing process for rejects to see if the worker needs additional training, (4) it allows for more flexibility within the system because of the variations needed in scheduling, and (5) it increases job satisfaction.

The major disadvantage encountered in redesigning the job is overcoming resistance to change. This is not surprising since people tend to resist any changes in the traditional manner of performing a particular job.

Another disadvantage is the union opposition which prohibits wider use of job enlargement. One of the reasons to be applied extensively in clerical operations and among supervisors is to introduce the concept in areas that are not rigidly prescribed by the conditions set

down in collective bargaining agreements. If union opposition to job enlargement does exist, it can probably be overcome if the union is invited to participate in the initiation and formulation of new applications of the concept. A joint union-management committee might be established to study how and to what extent the concept can be used to improve job design and increase benefits to the worker. At the same time management need not lose sight of the primary objective of job enlargement--the realization of greater profits--through more effective utilization of human resources.

Limitations to job enlargement which prevent it from being the solution to all problems of repetitious jobs are:

a. There are many jobs in the factory which because of the nature of production process do not lend themselves to enlargement. This would particularly be true for those cases where the machine cycle dictates the pace of the worker. When the operator does not have control of the cycle, there is less chance for the application of job enlargement, although the job content can be modified to take advantage of some aspects of the concept.

b. The duplication of equipment, tools and fixture which would be necessary at the individual work stations. Because the worker is using multiple equipment and can use only one tool at a time, there is a lower utilization rate.

However, this only comes into consideration when a large investment is involved in setting up individual work stations. Multiple work stations also require additional space and additional material handling equipment, since more components are being assembled or machined. Obviously, a point can be reached where the amount of output does not justify the space being used.

c. The training time involves is crucial since the effectiveness of job enlargement depends upon the additional training received. Not only are the technical aspects of training salient, but the predisposition of both management and the worker toward training is significant. In most cases, companies are anxious to get workers on the new job as soon as possible. Such an attitude is questionable because workers initially experience much anxiety on the new job. In addition, since job enlargement programs place greater demands on the worker by upgrading his job, training cannot be a one-shot effort.

C. JOB ENRICHMENT

What if job enlargement is not the answer? In some instances it has accomplished a great deal. However, due to limitations imposed by job enlargement it may not be advantageous in some situations. In that case management must look for other ways to motivate the workers. Job enrichment may be the answer. In formulating a definition

of job enrichment we are indebted to Professor Herzberg, who identified two parts to a job: the job surroundings refer to salary, benefits, supervision, security and all those things employees have come to expect. The job itself consists of one or more tasks which, in many cases, can of themselves motivate or demotivate the employee. The objective of a job enrichment program is to so arrange the components of the job that the job itself motivates the employee. [Ref. 27]

Job enrichment with full management commitment is rare according to most experts. Although there has been some advancement in this area, almost all of it has been in non-union firms. Some experts insist that job enrichment would make drastic improvements in the auto industry or steel mills. Resistance to implementation of this method has come from both management and labor. Those who run a plant move from assignment to assignment quite frequently and hesitate to undertake such a program primarily for two reasons: (1) the time necessary in order to get a program running smoothly, and (2) profit takes a setback making managers look bad on the balance sheet. Unions have denounced enrichment, claiming it is simply a way of speeding up production. Of course, salary plays an important role even in enlarged or enriched jobs. One reason enrichment has not been a raging success is due in part to

the fact that management is asking the worker to do more for the same pay. In other situations this would be considered a promotion and be accompanied by a corresponding raise in pay [Ref. 28].

In 1976, William Wimpisinger, General Vice-President of the International Association of Machinists in Great Britain said the following:

> Job enrichment is just a stopwatch in sheeps clothing....If you want to enrich the job, enrich the paycheck. The better the wage, the greater the job satisfaction. There's no better cure for the blue-collar blues. [Ref. 29]

Perhaps he is right. Certainly, the blue-collar worker is not motivated by the same things a manager or professional would be motivated as the SRC study indicates [Ref. 23].

Job enrichment is an attitude of management. Sometimes management must look for certain characteristics to find a way of implementing enrichment programs. The basic idea is to give the worker more responsibility in determining goals as well as for the finished product. By allowing the worker more responsibility, management relinquishes some authority. This practice means those most involved make the decisions. Another form of job enrichment is the job team. Individuals are assigned to small working groups where they can relate to each other. The worker and his team try to achieve the same common goal. The teammates work together and share the rewards of a good job. Each team member is allowed a

chance to rotate jobs within his group. Each member then learns how to perform the task the group is responsible for and takes turns doing them until all members have performed each job. The cycle is then repeated. Monotony is eliminated in this manner and the worker learns to relate to a finished product rather than an element of the whole [Ref 30].

Managers must realistically examine their situation before attempting to implement any of these programs. They cannot randomly pick a program expecting it to work in any and every situation. The content of the job should demand from workers not only endurance, but it must also contain some variety to reduce boredom. The job must offer the worker a chance to progress and continue learning more about the job at his own speed. For this system to work effectively, an employee must participate in the decision making process and then decide his own course of action. Most importantly a job must provide a worker with a future of which he can be proud. This means forming a relationship between the worker and his job. In order to accomplish these needs and still maintain production levels, the manager has to devise a plan that will provide the motivation needed.

D. JOB INVOLVEMENT

Management must adjust the working climate in order for positive employee drives to emerge. The results of job involvement come from what is known to economists as a laissez-faire attitude: leave it alone. Management responds positively to involvement but does not attempt to structure it. Instead they develop new policies which complement the ideas of job involvement [Ref. 18].

In implementing this approach to motivation, management employs an "open door" policy from the very beginning. Rather than hiring new workers on a probationary period, the first-line supervisor becomes involved in any problem that arises with a new person. This policy assumes that the new worker is eager to work and be a part of the process from the beginning. Plants may do away with traditional time clocks and other controls of employee working time. This policy stands on the grounds that an employee can record his own working time and is responsible enough to do it correctly. Under this policy workers are not treated as children but as responsible adults. Incorporating a "buddy system" for new employees also helps them adjust and take on a more active role in the organization [Ref 31].

Perhaps the most important aspect of the procedure suggested pertains to levels of employment. This policy's intent is that factory and office personnel receive the same

benefits. Benefits may vary according to salary but should be uniform. Departmental meetings should be held approximately bi-monthly to discuss issues suggested by employees. In discussing these issues a breakdown of the hierachy of command should occur. These discussions should be held at the employees' work space rather than the managers' offices. Doing this results in a breakdown of the traditional territorial barriers between facotry workers and supervising management. Of courxe, there are many other procedures that can be employed, but the tactics previously listed are the primary ones that set the foundation for job involvement [Ref. 26].

E. ALIENATION

In implementing any of the above procedures, the alienation factor must be taken under consideration. Alienation can be defined as the constellation of attitudes, frustrations, and behaviours experienced by people existing under unsatisfying working conditions. Alienation has four different dimensions: [Ref. 26]

1. Powerlessness: The individual feels he has no capacity to affect management policies or rules, job conditions, and immediate work processes.

2. Meaninglessness: The condition in which the employee derives no sense of meaning or accomplishment from the product or service with which he works.

3. Isolation: The feeling of being socially isolated from others in one's place of employment.

4. Self-estrangement: Consists of boredom and lack of ego-involvement in one's job.

Basically there are two sides to the problem of worker alienation:

1. Productivity: At the present time in the United States, worker prodictivity is inadequate to meet international competition, inflation, and other economic and monetary problems.

2. Social: The effects of the workers alienation on his or her mental and physical health and on the social and psychological health of families and society are immense.

Therefore, the workers' alienation not only affects productivity, it also reflects social costs incurred in the workplace. In some cases alienation is expressed by massive withdrawal evidenced by tardiness, absenteeism and turnover.

F. SUMMARY

Workers, generally, are dissatisfied with their work situations. Basically there are blue-collar skilled, semi-skilled and unskilled, as well as white-collar worker, in routine jobs. Young workers are less satisfied than middle-aged ones. Blacks are less satisfied than whites and lower paid workers are more dissatisfied than higher paid ones. Workers tend to rebel against their union leaders. They

are becoming less concerned about quality of their product and more concerned about the quality of their working conditions. To protest the workers go on strike for higher wages, better working conditions, more job security, and revolt against taxes. However, few of these attempts bring satisfying results since wage gains are diminished by higher prices, and lower taxes cause deteriorating community services such as schools, sanitation, police protection, and medical care.

Enlarged jobs require approximately a 10% increase in capital required for construction [Ref. 28]. This additional investment may be offset in the long run due to cost savings resulting from reductions in absenteeism and turnover rates. Today, more than ever, innovations in management are needed to correct these problems. By improving working conditions and workers' morale, managers increase their firms' productivity.

Management must take several other factors into consideration when contemplating the implementation of any of the proposals outlined thus far. Even an enlarged job could become boring in a matter of time. This effect may be neutralized by the pride an employee could take in becoming a skilled laborer, rather than just another assembly line worker.

Perhaps the main reason barriers are existing between management and labor is that these barriers have evolved

over a period of time. Now it is up to management to tear down these barriers by designing jobs that are desirable to the workers and satisfactory to management. In order for a firm to grow in the existing economy, these barriers must be eliminated.

Management must work to cultivate a close communication system between itself and the workers. Managers must learn what the worker needs to be satisfied with his job and well motivated so he will strive for the company goals, rather than just his own. There are a number of ways of accomplishing this, most of which are found in job enlargement, enrichment and involvement. And that is the goal of this thesis to give the manager a guidepath out of the forest of the unknown.

The foundations of methods needed to satisfy the workers exist. It is up to management to incorporate these abstract ideas into concrete proposals that will apply to their particular situations. They must take actions that will satisfy their workers if they are to survive in today's economy. Most modern workers no longer want merely to work eight hours, get paid and go home. They want to become involved in the issues that affect their lives.

Workers need jobs that are designed to provide variety rather than requiring pure endurance. Workers want to have the right to learn and progress in their jobs. Only by participating in the decision-making process will the

worker be able to relate to his job, his company and his line of work. By relating to his job as one that leads to a desirable future, he will become more satisfied. This satisfaction will supply management with the remedy to "assembly line blues" and no doubt an increase in productivity with a corresponding decrease in absenteeism and turnover costs.

III. TECHNOLOGY AND WORK DESIGN

A. GENERAL

"A factory environment, infused with an atmosphere of trust and respect for all individuals is the dream of many managers, but that dream often must remain on idealized image as day to day problems monopolize their energies."[1]

Technological change, which is proceeding at an incredible rate, creates constant problems of obsolence, demand for new services, and the expansion of existing services and facilities. With the advent of automation and computers, the work environment has become highly unpredictable. As the social and personal needs of workers become recognized in the technological environment, industry must look to conditions that increase job motivation, give work and sense (enrichment) of meaning and identification and create a sense of autonomy.

Industry has involved into a complicated, technically engineered system with a philosophy of maximum production and profit, totally disregarding the needs of the human element. The history of industry records numerous studies and attempts in terms of human engineering, related only to

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[1]Anonymous, "Humanize Then Enrich Factory Environment," Industry Week (Jan 1974), p. 43.

design of man-machine systems and physical plant layout and design.

People are required to operate a technical system. Therefore, employee relationships and adjustments to the system reflect the degree of satisfaction through performance and productivity or alienation through absenteeism, sabotage, sub-quality production, etc. Efforts to explain and provide techniques for dealing with employee satisfaction within the technical environment are in a state of continuous evolution. These efforts and techniques have had many titles:

Job Enrichment - to provide more varied and challenging content in the work.

Participating Decision Making - to enable the information, judgments, and concerns of subordinates to influence the decisions that affect them.

Management by Objectives - to enable subordinates to understand and share the objectives toward which they strive and against which they are evaluated.

Sensitivity Training or Encounter Groups - to enable people to relate to each other as human beings with feeling and psychological needs.

Productivity Bargaining - to revise work rules and increase managements flexibility with a quid pro qup whereby the union ensures workers a share in the fruits of the resulting productivity increases. [Ref. 32]

Consequently, rigid working conditions must be reshaped to define the human element in terms of a democratic organizational concept in which the superior at least consults with subordinates, soliciting their responses, feelings or thoughts [Ref. 33].

"Work must not be simply the penalty what a man pays to survive; it must be something that offers meaning of itself."[2]

B. CHANGE AND TECHNOLOGY

Organizations regularly move back and forth between periods of relative stability and periods of transition and instability. The change to wholly redesign an organization comes only rarely. Yet there are many other occasions when the principles of work redesign can be used appropriately and with considerable impact, particularly when those "stable" organizational systems that make the planned change so difficult become temporarily unstable. During such periods of turbulence, the defenses of an organization against change are down and, therefore, it may be possible both to introduce meaningfully changes in jobs and to work out an appropriate fit between those innovations and the surrounding organizational systems before things settle down again.

"This is a time when Government and business and labor should be sitting down to plan the future, to establish national priorities, and to agree on objectives and strategy."[3]

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[2]Trevor Armbrister, "Beating Those Blue Collar Blues," Readers Digest, Apr 1973, p. 234.

[3]McFarland, James P., Chairman of the Board, General Mills, Inc., A Look at Business in 1990, US Government Printing Office, Washington, DC, 1972, p. 293.

"A strategy of change it's not a simple task to be accomplished thinking it Friday and implementing it on Monday," as Professor R. T. Harris at the Naval Postgraduate used to say during his teaching. Under Professor Harris' approach we should look at the organization as an open system which is consisting of the following components: (1) environment, (2) technology, (3) people, and (4) tasks. Those components are highly interrelated and we can measure the outcomes as the degree of effectiveness when all above components are in balance or out. The organization's readiness to respond to change can be measured as a probability function C.

$$C = A \times B \times D$$

where C is the probability that the change will occur, A is clear and consenses goals, B is the degree of dissatisfaction with the present status quo and D is the existence of perceived initial viable action steps. Further on, he states, between Friday and Monday there should be a transition period which will close the gap between present and future. This period should be defined timely before getting started. But above all, when a manager has to do a change, he has to consider the following route:

First, we have to see and define the future as it lies ahead. Specifically we have to define the time, tasks, structure, people, environment, technology and the outcomes of the organization.

Second, we have to examine the present and see what is different.

Third, during the transition period we have to make all the necessary actions required to fill the gap between present and future. About those specific steps that should be done by a manager in designing change, especially the redesigning of the work is the purpose of the following chapters.

C. WHAT IS WORK REDESIGN?

Work redesign is a political process, the art of the possible. It is done in the real world where there are limits to power, where "is" rather than what "ought to be" is dominant and stakeholders are numerous. A stakeholder is one why may perceive potential gain or loss if things are changed and who has power to constrain or prevent change. A stakeholder thinks: How might I gain, how might I lose, and how can I know?

Work redesign must take place in an ever-changing situation. Things won't stand still while the organization and its technology are redesigned. People retire, quit, get promoted, are reassigned, are not reelected. Replacements may come in from the outside. Product demand changes. Products and technologies change. Raw materials change. Economics change. Companies merge, are taken over; units are spun off.

Work redesign involves change at a fundamental level. Fred Emery, sociotechnical theorist formerly with the Tavistock Institute in England, stated it well: "In the past, we asked only what does the technology require of the individual? In work redesign we ask also what does the individual require of the technology?" Adding the second question radically changes the characteristics of an organization while reducing unit labor costs, improving quality control, reducing waste and recycle, gaining higher utilization of equipment, and reducing absenteeism and turnover in essence, increasing productivity.

Work redesign leads to more participation, especially by the people in the lower levels of the organization. It leads to changed roles and expectations of all organization members, whether they are in a union or not. It leads to changes in how seniority is applied as well as to changes in philosophy of pay and payment methods; it leads to new methods of job evaluation; it decreases the levels in the management structure and the number of managers needed. Fewer workers are required.

Work redesign is systemwide, systemic (everything is connected to everything else and change must come gradually); it is a long-term process of assessing and planning change, trying it, learning from it, and then repeating the process. Thus, the goal of work redesign is a process for change. [Ref. 33].

D. TECHNOLOGY, PEOPLE AND JOB DESIGN

They never call in sick. They never take coffee breaks. They never get bored. They don't mind heat or dust or strong chemicals. They can work 24 hours a day. They don't require medical insurance or retirement plans. They are efficient. They reduce waste. They produce excellent quality. That is a machine--a product of technology.

As the tasks performed by humans grow more complex, the complexity of machines replacing human labor grows. Additional demands are placed upon mechanical labor-saving devices such as: (1) lower cost, (2) higher reliability and (3) less human control. The concept and definition of robotics have grown to embrace the electromechanical technology which could meet these additional environmental and work demands. For example, many lower-level manufacturing jobs now require both non-routine and routine motions, manipulation of objects, sensing the orientation of objects and decision-making ability. Thus, humanlike machines performing such functions require more complex descriptions.

"What is a robot? If you are hoping a robot is a humanlike machine that will zoom around your house, answering the telephone, washing dishes, vacuuming the carpet, changing the channels of the television set, and walking the dog, then you will be disappointed. If, on the other hand, you are hoping a robot is a machine that can do jobs

too dangerous, too boring, or otherwise unappealing for human beings, and save you money in the process, then welcome to 1982." [Ref. 34]

"The Robot Institute of America (1980) defines a robot as 'a reprogrammable, multifunctional manipulator designed to move material, parts, tools or specialized devices through variable programmed motions for the performance of a variety of tasks.' A current trend is to divide robots into 'classes' based upon their resemblance to human beings in appearance and function. Robots which approximate the appearance and many functions of human beings are called 'outhropomorphic' while the class of robots which do not resemble human beings and perform limited human functions." [Ref. 35]

1. Technological Impact

"The first industrial revolution in America occurred in the last half of the nineteenth century after steam power was harnessed for commercial use. Steam power technology helped man move heavy objects quickly and easily. Gradually, steam power was replaced by direct use of fossil fuels, but their goal of running labor saving devices to replace beasts and humans were the same. Introduction of this technology also gave rise to the assembly line method of organizaing work for greater output and efficiency. Technological advances have occurred steadily over the years,

but a new combination of technological and economic requirements could cause robotics technology to be used, which would thrust the United States into a second industrial revolution.

As Americans see U.S. productivity in both the public and private sector fall behind those in Japan, West Germany and other nations, a concern for greater productivity has emerged." [Ref. 36]

"Recent changes in federal tax legislation underscores the emphasis upon technological investment technology. Recent successes in Japan and to a lesser extent in the U.S., point to robotic technology as the key to a projected new wave of technological advances. This second industrial revolution would be characterized by computer controlled manipulation of objects and data with quasi-independent decision-making by machines. Advances in microelectronics, sensors and computer programming would fuel this growth in robotics. Although vestiges of older technologies will no doubt remain, the basic infra-structure of the economy could shift to dependence upon the new robotic technology exceeding its dependence upon information processing technology. Technological advances have exceeded the projections of forecasters for the proceeding 20 years and technological forecasters are predicting even greater accomplishments by the year 2001." [Ref. 35]

2. Behavioral Impact

"The complexity of the technology tends to affect the attitude of workers. Automation is a fixed technology and robotics is a flexible technology with information processing technology falling between the two technologies. The advanced, more varied capability of robots makes the technology more complex. Therefore, robotics is not simply more automation, but automation is a component of the more complex technology. .The attitude of workers toward technology and its role in the workplace greatly affects the rate and extent to which new technology can be introduced effectively in organizations. For example, Sheppard and Herrick addressed themselves to certain aspects of work group and individual behavior as a response to technology. However, without a discernable shift in values, attitudes, and activities, both workers and managers are likely to react in part much the same to robotics as they did to "older" less complex technologies. Worker feelings toward new technologies have been traditionally of a suspicious and sometimes rejecting nature. For example, new technologies have been viewed by workers as:

a. Reducing job opportunities

b. Having been imposed upon them by management without consultation and

c. Including little or no worker participation in decision-making regarding their jobs.

When unions represent workers, job control and other negative institutional power shifts are perceived by both union officials and the jobholders. These perceptions, together with traditional management values, attitudes and practices, plant the seeds of further distrust, dissatisfaction and alienation." [Ref. 35]

3. Organization Impact

"Selection of workers and managers in most organizations is a key human resource management activity. Essentially it involves attracting, picking and rejecting potential job seekers. This area would involve activities surrounding direct competition between human beings and robots for jobs. Often the personnel staff helps line management develop the most cost effective staffing level for the organization. If robots are available and competent to perform the same tasks as humans, it would be reasonable to make direct comparisons between human and robotic 'applicants.' Intelligent robots could turn out to be superior to human b eings for certain jobs. Also, poor working conditions could make robots preferred candidates for many jobs." [Ref. 35]

E. SOME BARRIERS TO WORK REDESIGN

"The change to wholly redesign an organization comes only rarely. Yet there are many other occasions when work redesign can be used appropriately and with considerable

impact. Particularly when those 'stable' organizational systems that make planned change so difficult become temporarily unstable. During such periods of turbulence, the references of an organization against change are down. And therefore, it may be possible both to introduce meaningfully large changes in jobs and to work out an appropriate fit between those innovations and the surrounding organizational systems before things settle down again....Because new work technologies invariably require some adjustment of jobs and workflows, they can provide excellent opportunities for reviewing and revising the motivational structure of the work and for improving the design of organizational systems and practices that support the work. And line managers sometimes can have a good deal of influence over how work is restructured in response to technological innovations. [Ref. 37]

1. The Technological System

"The technology of an organization can constrain the feasibility of work redesign by limiting the number of ways that jobs within the technology can be designed. In certain kinds of technologies, for example, it simply is not possible to build meaningful amounts of autonomy, variety, or feedback into the jobs." [Ref. 38]

"Views like the above 'suggest that if work is to be meaningfully redesigned in an organization, either

(1) the technology must be of the type that provides at least moderate employee discretion or (2) the technology itself must be changed to be compatible with the characteristics of enriched work." [Ref. 37]

2. The Personnel System

"It appears that the personnel systems should be examined prior to work redesign to determine if these is enough room in the way jobs are being defined for meaningful changes to be made. If there is not sufficient slack in existing job descriptions and personnel practices, and if it is not possible to circumvent the personnel system or to introduce additional flexibility in that system, then the project risks falling victim to the 'small change' effect. Better, in our view, would be to do is to decide not to attempt work redesign under conditions that make meaningful change unlikely or unacceptably costly." [Ref. 37]

3. The Control System

The organization's control system can also constrain the feasibility of work redesign. "By control systems we mean any "mechanical" system that is designed to control and influence employee behavior in an impressional, impartial and automatic fashion.

"Control systems include budgets and cost accounting systems, production and quality control reports, attendance measuring devices and so on." (Reeves and Woodward, 1970)

There may be large internal costs associated with offering or scrapping a control system. Establishing a good control system often involves a large initial investment, perhaps including the purchase of computer hardware and the development of sofisticated programs to access unit productivity and management performance. Altering such a system could involve the costly development of new control system technology in addition to the person-hours required to set up the technology. Finally, there are always personnel in organizations whose own jobs depend on the maintenance of existing organizational systems. "Therefore, attempts to change the control system (particularly if the idea is to "loosen" technically sophisticated controls) are very likely to encounter resistance from those who have a personal and professional interest in the preservation and refinement of existing control procedures in essentially their present form." [Ref. 37]

IV. PLANNING FOR WORK REDESIGN

A. PEOPLE AND PRODUCTIVITY

"There is no question that increasing productivity is a primary concern of our nation. You know the statistics. Our nation's productivity growth rate has slowed from an annual growth rate of 2.4 percent during the "50's" and "60's" to less than 1 percent in the "70's." These growth rates are significantly below the growth rates of our international competitors, making us uncompetitive in the marketplace. However, if you come today seeking a simple formula for improving productivity, I won't be able to give it to you. (Emphasis added is mine.) The nature of employees' productivity is extremely complex and the components are difficult to deal with.

...In addition, we must concern ourselves with the perception employees and employers have regarding programs to increase productivity. To many, the perception of productivity is speed up, work faster, work harder, lay off people, while the corporation gets higher profits. In short, employees are just pieces of equipment to be used and they must always face job insecurity.

On the other hand, there are studies that show individuals are happier doing a job efficiently than when doing it inefficiently. People do like to do a good job and

contribute their share. They take pride in their work when it's done well, and they like to use their abilities effectively." [Ref. 39]

In 1980, the U.S. Chamber of Commerce published a survey on workers' attitudes toward productivity. This survey showed that:

1. U.S. workers are generally optimistic and enthusiastic about doing a good job, despite a belief that they stand to benefit least from improved productivity and performance.

2. They seek incentives to work hard through money reward and personal recognition.

3. Improved productivity and performance depend not only on worker's attitudes and abilities, but also on the attitudes and abilities of management.

4. Workers would rather work with management than for management.

5. Job security is especially important. Workers believe it is difficult for them to find new jobs.

6. Workers are optimistic about the future prospects for their companies.

In summary, the chamber said:

> One of the major conclusions to be drawn from the survey is the overall concern of the U.S. workers expressed for the performance and productivity of their companies or organizations. The survey identified a willingness among U.S. workers to work hard and do their best, but stressed the importance of recognition by their supervisors and the case for more involvement in the decision making process of their companies or organizations. [Ref. 39]

B. IMPROVING PRODUCTIVITY THROUGH JOB ENRICHMENT

1. Assumptions

To support and develop an effective job enrichment program we must believe that certain job conditions, if present, operate to build high levels of motivation and job satisfaction.

(a) Employees want full responsibility for performance of their assigned tasks.

(b) They want to decide when and how tasks should be done; they want to participate in decisions affecting their work. Employees want to experience a sense of achievement from solving problems and completing tasks independently. They want to see the results of their own efforts and to feel that they are performing worthwhile tasks.

(c) Employees want to be recognized for their accomplishments.

(d) Employees want jobs they find interesting.

(e) Employees want an opportunity for growth and advancement on the job. This involves increasing their professional competence on the job, applying new learning and then move on to a more challenging assignment.

(f) Every job should have as many of these motivating factors as possible. [Ref. 40]

Job enrichment theory sounds good, but the acid test lies in its application to job design work. How do we build these motivating factors into a job?

The central issue in job enrichment is just how a job should be changed. Complete consensus about what aspects of a test are most important to restructure doesn't exist, but there is considerable agreement on five:

(1) Job Wholeness. The view here is that in many jobs, there is too much specialization and fractionization. A data processing clerk punches cards, but someone else checks them. A home heating expert costs and writes up the contract for a furnace, but other people install it, and still offers follow up on the warranty. The newer view is that, as much as is possible (and with no increase in total work volume), separate and related dimensions of a job should be put together into a meaningful, sensible whole. The reason? Human nature. Most people like variety and are happier using at least a modest range of talents rather than just one.

(2) Feedback. People want to know how they are doing in their jobs and they would rather find out for themselves in specific terms than listen to the boss talk in generalities.

(3) Personal Contact. Most people (though there are a few exceptions) like to work closely with other people rather than in seclusion.

(4) Client Identification. Many people feel they are working in the dark because they have little or no

contact with those they serve (bank loan officers, auto assembly workers, etc). One office supply manufacturing company has set up periodic meetings between shop employees and customers to discuss quality, customer needs, and problems. This modest arrangement, say the employees, has "added sparkle" to their jobs and made them more aware of quality standards.

(5) Discretionary Content. There has been a relentless tendency in the world of work to program jobs until they consist of "steps-one-through-18." But most of us like to be able to use our heads, do things a different way occasionally or make a decision without the boss's approval." [Ref. 41]

What all this amounts to is that most people want more variety, depth and autonomy in their jobs--things that, according to behavioral scientists, are permanently gratifying than high pay, fair supervision, nifty work surroundings or a good vacation policy.

That sounds pretty simple. But making changes to accommodate such wishes is not. The worst thing you can do is plunge headlong into a redesign project either of your own or even under the guidance of an expert. But be careful, go slowly and avoid disasters that might find in your way.

2. Companies Experiences with Job Enrichment

During the past 20 years or so, a number of large corporations in U.S., Canada, and Europe have followed the lead of behavioral scientists and changed their opinions about the best way to improve employee motivation, which is, after all, usually at the root of battling to reduce employee turnover and absenteeism and make their workers more productive. Many of them now believe that the key lies not so much in the way you treat your workers--job context, they call it--but in job content, or what those workers actually do day in, day out. If you can shape or reshape jobs so that they become more challenging and fulfilling than merely tightening the same fitting on an assembly line or inspecting other people's work for eight hours a day, they say, you'll end up with workers who are better motivated and quite possibly more productive. And they've developed techniques that you may well be able to adapt to improve the "thin" or "dead" jobs that probably exist in your much smaller enterprise. The pacesetters in job enrichment, as the process is known, have been such corporate giants as AB Volvo in Sweden, the Pet Foods Division of General Foods Corporation and Texas Instruments Inc. in the U.S. and Toronto-based manufactures Life Insurance Company in Canada. In a much publicized pioneering move some years ago, Volvo completely revolutionized its auto assembly lines by turning over production,

planning, monitoring and inspection chores to teams of workers instead of using the traditional work-station approach. Texas Instruments more than halved the cost of assembling some products when it began allowing employees to allocate work among themselves, set quality standards and do their own janitorial work. General Foods reduced absenteeism by 91% and increased productivity to the point where it required no fewer workers of a Kansas plant in which it set up highly autonomous work teams. And Manu-Life has reported that moves it has made in recent years to cross-train clerical employees in three separate functions in its underwriting and administrative areas--instead of having them specialize in only one--has paid off in higher job satisfaction and reduced manpower costs. [Ref. 41]

3. Summarization

In sum, I believe that job enrichment is fundamentally business strategy, and because of that we have an instrument with which we can get the managers of sections, departments, etc. "turned on" and willing to look objectively at what kind of work they are expecting people to do, what they are doing themselves, what kind of processes are going on and what kind of improvement changes should be made and how.

V. MY HANDBOOK

A. THE NEED FOR A HANDBOOK

Although there are several theories and experiences on work redesign programs, never the less nobody has put them together to give an overall picture of the process.

Managers do not have a comprehensive tool to guide them in doing work redesign with methodology in every particular stage.

Most of the authors are dealing with one particular subject without touching the whole spectrum of work redesign.

On my effort to provide managers with a study guide doing work redesign, I tried to tie job enrichment and technology into a work that will fulfill "all" the needs of a concerned manager in a "handbook."

On previous chapters we examined the wide theoritical spectrum of work, people, and productivity. My "handbook" will include some review of earlier discussed material in trying to bring in a single chapter a way of doing work redesign in an effort to help the manager find his way out of the foggy forest.

Management itself must act to implement and maintain well defined programs that can eliminate and reduce costs through the more effective utilization of available resources. Work redesign is a management "tool" well suited to this purpose.

At first we are going to examine existing theories and systems to work redesign, then evaluate them according to principles discussed earlier. Afterwards comparing the above we will try to guide the manager implementing either of the theories.

B. THEORIES OF WORK REDESIGN

Most work redesign activities are guided by one or another of the four theoritical approaches summarized below. We'll begin with a theory that has a very psychological focus (activation theory), then to two "mid-range" theories (motivation-hygiene theory and job characteristics theory), and we'll conclude with a more molar and system focused theory (sociotechnical systems theory).

1. Activation Theory

As mentioned before, numerous human problems have been associated with work on routine, repetitive tasks. Included are diminished alertness, decreased responsiveness to new stimulus inputs, and even impairment of muscular coordination. Employees who work on highly routine jobs are often observed to daydream, to chat with others rather than work on their tasks, to make frequent readjustments of posture and position and so on.

Activation theory can help account for such behaviors. [Ref. 42] Basically, activation theory specifies that a person's level of activation or "arousal" decreases when

sensory input is unchanging or repetitive, leading to the kinds of behavior specified above. Varying or unexpected patterns of stimuli, on the other hand, keep an individual activated and more alert, although over time the individual may adapt to even a varied pattern of stimulation.

One approach to work redesign that is based on activation theory is that of job rotation, that is rotating an individual through a number of different jobs in a given day or week, with the expectation that these varied job experiences will keep the person from suffering the negative consequences of excessively low activation. The problem, it seems, is that people adapt fairly quickly even to new stimulation, and if the new task is just as boring as the old one, then no long-term gains are likely.

At present, activation theory seems most useful for understanding the consequences of jobs that are grossly understimulating (or overstimulating). Except for the pioneering work by Scott [Ref. 42] and more recent theorizing by Schwab and Cummings (1976) [Ref. 43], relatively little progress has been made in applying the tenets of activation theory to the design of jobs so that they foster and maintain high task-oriented motivation.

2. Motivation-Hygiene Theory

By far the most influential theory of work redesign to date has been the Herzberg two-factor theory of satisfaction and motivation [Refs. 44, 45]. This theory proposes

that factors intrinsic to the work determine how satisfied people are at work. These factors, called "motivators," include recognition, achievement, responsibility, advancement, and personal growth in competence. Dissatisfaction, on the other hand, is caused by factors extrinsic to the work, termed "hygienes." Examples include company policies, pay plans, working conditions, and supervisory practices. According to the Herzberg theory, a job will enhance work motivation only to the extent that motivators are designed into the work itself; changes that deal solely with hygiene factors will not generate improvements. [Ref. 46]

Motivation-hygiene theory has inspired a number of successful change projects involving the redesign of work (e.g., Ford, 1969 [Ref. 47]; Paul, Robertson, and Herzberg, 1969 [Ref. 48]. Because the message of motivation-hygiene theory is simple, persuasive, and directly relevant to the design and evaluation of actual organizational changes, the theory continues to be widely known and generally used by managers of organizations in this country. There is, however, considerable uncertainty and controversy regarding the conceptual and empirical status of motivation-hygiene theory qua theory. For a succinct treatment of the theory, see Herzberg (1968) [Ref. 49]. For reviews of research assessment of the theory, see King (1970) [Ref. 50], House and Wigdor (1967) [Ref. 51], who are particularly skeptical

and Whitsett and Winslow (1967) [Ref. 52] who are particularly sympathetic.

3. Job Characteristics Theory

This approach attempts to specify the objective characteristics of jobs that create conditions for high levels of internal work motivation on the part of employees. Based on earlier research by Turner and Lawrence (1965) [Ref. 53], current statements of the theory suggest that individuals will be internally motivated to perform well when they experience the work as meaningful, they feel they have personal responsibility for the work outcomes, and they obtain regular and trustworthy knowledge of the results of their work. Five objective job characteristics are specified as the key ones in creating these conditions: skill variety, task identity, task significance, autonomy and feedback from the job itself [Refs. 54, 55].

When a job is redesigned to increase its standing as these characteristics, improvements in the motivation, satisfaction, and performance of job incumbents are predicted. However, individual differences in employee knowledge and skill and in need for personal growth are posted as imfluencing the effects of the job characteristics on work behaviors and attitudes. Strongest effects are predicted for individuals with ample job-relevant knowledge and skill and relatively strong growth needs.

A diagnostic instrument, the Job Diagnostic Survey, has been developed to assess employee perceptions of the job characteristics listed above, selected attitudes toward the work and the organization, and individual growth need strength [Ref. 56]. This instrument is intended for use both in diagnosing work systems prior to job redesign and for assessing the consequences of work redesign activities.

For an overview of the theory that emphasizes its practical application to work restatement of the theory, including its application to the design of work for groups as well as individuals, see Hackman and Oldham 1980 [Ref. 57]. For a skeptical view of the job characteristics approach, see Salancik and Pfeffer, 1977 [Ref. 58].

4. Sociotechnical Systems Theory

Contrasting the job-focused theories mentioned above, the sociotechnical systems approach emphasize the importance of designing entire work systems, in which the social and technical aspects of the workplace are integrated and mutually supportive of one another [Ref. 59].

This approach emphasizes the fact that organizations are imbedded in, and affected by, an outside environment. Especially important are cultural values that specify how organizations "should" function and generally accepted roles that individuals, groups, and organizations are supposed to play in society. Thus, there is constant interchange

between what goes on in any given work organization and what goes on in its environment. This interchange must be carefully attended to when work systems are designed or changed [Ref. 60].

When redesigned in accord with the sociotechnical approach, work systems are never changed in piecemeal fashion. Although jobs, rewards, physical equipment, spatial arrangement, work schedules (and more) may be altered in a sociotechnical intervention, none of these is taken as the primary focus of change activities. Instead, organization members (often including rank-and-file employees and/or representatives of organized labor as well as managers) examine all aspects of organizational operations that might affect how well the work is done or the quality of organization members' experiences. Changes that emerge from these explorations invariably involve numerous aspects of both the social and technical systems of the organization. Typically, however, such changes do involve the formation of groups of employees who share responsibility for carrying out a significant piece of work--the "autonomous work group" idea mentioned earlier [Ref. 61]. Such groups are becoming an increasingly popular organizational innovation and now are frequently seen, even in work redesign projects that are not explicitly guided by sociotechnical theory.

For a summary of sociotechnical systems theory as it applies to work redesign, see Cherms (1976) [Ref. 62], Davis

(1975) [Ref. 63] or the now-classic study of coal mining by Trist, Higgin, Murray, and Pollock, 1963 [Ref. 64]. For a critique of the theory, see Van der Zwaan (1975) [Ref. 65].

C. COMPARISON OF THE THEORETICAL APPROACHES

Activation theory, motivation-hygiene theory, job characteristics theory, and sociotechnical systems theory offer different approaches to work redesign. Activation theory specifically addresses the dysfunctional aspects of repetitive work, whereas motivation-hygiene theory and job characteristics theory emphasize ways to enhance positive motivational features of the work. The Herzberg model differs from the job characteristics theory in proposing a more general process for increasing motivation (i.e., identify motivators and increase them), whereas the job characteristics approach emphasizes specific diagnostic procedures to optimize the fit between people and their work. Sociotechnical systems theory contrasts sharply with the other theories in that it emphasizes the design of work for groups rather than individuals.

Another difference among the theories lies in their assumptions about how the redesign of work should be planned and implemented. Activation and motivation-hygiene theories appear to put burden on management to identify the problematic aspects of the work. Neither approach suggests extensive gathering of information and inputs from employees.

As the other end of the continuum, sociotechnical work redesign projects involve a high degree of worker participation. Job characteristics theory emphasizes the importance of understanding workers' perceptions and attitudes toward their jobs but does not explicitly require their participation in actual planning for work redesign.

D. DIAGNOSTIC AND EVALUATION METHODOLOGIES

How are we to assess the readiness of work systems for work redesign, to ascertain precisely what changes are called for in those systems, or to measure the consequences of the changes that are made? Heretofore, most diagnostic and evaluation methodologies have relied on paper-and-pencil instruments completed by individuals whose jobs are about to be (or have been) redesigned. As Walton (1980) [Ref. 66] notes, there are reasons for caution and skepticism in the use of such methods, even when they are psychometrically adequate (also see Borr, Brief, and Aldag, Note 1 [Ref. 67] for a critical analysis of the psychometric properties of existing instruments that measure perceived task characteristics). Yet there also are significant problems in relying on the perceptions of managers and consultations about people and their work when work systems are diagnosed and the effects of job changes are assessed. Research has shown, for example, that both cognitive limitations and social distortions can significantly bias what is seen by

observers who have a "stake" in the organization or in contemplated changes [Ref. 57, Ch. 5]. What, then, is to be done to improve our diagnostic and evaluation capabilities?

Researchers both at the University of Michigan (Lawler, Nadler, and Cammann, 1980) [Ref. 68], and at the University of Pennsylvania (Van de Ven and Ferry, 1980) [Ref. 69], have recently developed organizational assessment packages (some parts of which include observational and archival measures as well as paper-and-pencil instruments) that may be of considerable use in diagnosing and evaluating work redesign programs. One especially promising approach to measuring the outcomes of work redesign has been developed by Macy and Mirvis [Ref. 70] as part of the Michigan project. This methodology involves defining, measuring, and costing certain kinds of behavioral outcomes in economic terms. It appears to offer the potential for more rigorous assessment of the economic effects of work restructuring than has heretofore been possible; ultimately, it should help reduce some of the previously noted ambiguities in comparing the outcomes of different work redesign activities.

E. THINGS TO REMEMBER BEFORE YOU GET STARTED

If work redesign is so good, why isn't more being done? Why have most managers and unions been utterly deaf for messages that emerged in the early seventies about the

critical need for work redesign? The following are the three most important barriers in my opinion:

1. Managers have been a barrier. Overall, it has been a fight or flight approach: "With the plants I have, I'd rather keep on fighting with workers and their union." "If I need another plant, I'll build a new one and won't have to put up with theis fighting." "Sometimes I'll abandon a palnt when the situation is so bad that a new one is financially justified."

Some managers are overwhelmed by the work redesign process. They believe: "It's OK to fail when traditional methods are used, but if you depart from tradition, failure is inexcusable." This ethic, present in the career development process, reinforces inhibitions in the ranks of low-risk-prone managers.

2. Merges and takeovers also have been a barrier to work redesign, sometimes because of the sheer size of the new organization. In addition, managers intent on getting started seem to undergo a paralysis when takeover or merger is imminent. "One New York-based company was well into the work redesign process but stopped it abruptly when a takeover became imminent. Eighteen months later, the vice president of personnel for the original company called me in as a consultant to meet with the vice-president of personnel for the new company. No sooner was this meeting planned than another takeover was announced. Immediately

the corporate vice-president of personnel withdrew, saying all his energy would be used up in the transition." [Ref. 33]

3. Union leaders have been another barrier. With some remarkable exceptions, they have resisted publicly encroachment on their domain. When told of work redesign effort, some have responded, "it's a management trick" and "the way to enrich a job is to enrich the paycheck." Another response has been, "if the workers want it, they will ask for it."

F. HOW YOU CAN MAKE IT HAPPEN!

1. Getting Started

Given the obstacles of work redesign one may ask why get started at all? Work redesign can start in many different ways and in varying situations. But here are some general principles:

What is the situation: (Past, present, future): Is the business in trouble? Are you expanding your job? Does your business have new owners? Do you have a new boss? Are you about to enter labor contract negotiation? These questions and many others must be explored before a plan is delineated. (Follow Professor R. T. Harris' transition method, Beckhard and Harris, 1977.)

Have a theory of behavior: Find a theory of behavior between those discussed in this chapter and either adopt or create one of your own about workers behavior. Workers (and others) are not programmable; they have needs that they

constantly strive to fulfill. How they satisfy these needs is important. Can they be satisfied by the work itself or must they find some other outlets? "In a nation increasingly dedicated to improving it's quality of life, self-realization through useful and interesting work becomes a credible goal. Everyone in the working world will have to content with this phenomenon in the years to come."[4]

Here are some of the principle needs. "Decision-making--some is better than none, more is usually better than less. Reasonable use of the intellect--not too little, not too much, what is optimal will vary as one develops. Learn and continue learning--one's need to learn does not stop when the commencement exercise is over. Being informed--what is going on in the area immediately around one's work life?

Much behavior considered disruptive by managers and other workers can be traced to the lack of opportunity for people to satisfy their needs through the work itself. This is basic to the logic of work design.

Money is important, but if you believe money is the driving force for change, work redesign may not be for you." [Ref. 33]

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[4]The Honorable J. D. Hodgson, Secretary of Labor, Conference Co-chairman on the Industrial World Ahead, A Look Business in 1990, U.S. Government Printing Office, Washington, DC, 1972.

Know why you are doing it: Does it seem right? Are you fed up with the ways things are? Or has your boss told you to do it? Are you first in your division or company to try it, or are you second? It makes a difference; if you are second and you succeed, so what? It has already been done before. But being second and failing is another matter. These are but a few of the questions to think about in your work redesign efforts.

Clarify and test your expectations: Are you looking for a quick fix? Work redesign is not a quick fix. Also, there is no recipe. Do you see it as something for "those guys on the shop floor" or do you see it involving and require behavior change at all levels, including your own? In the second case the ever-important question is: What might I expect if work is not redesigned?

How much support do you have? Ideally, your boss's thinking on these points is congruent with yours. If you don't know, find out. What about your boss's boss? There are almost infinite variations from organization to organization, and dynamic as well. The biggest the support you have, the better your wor, redesign effort will succeed.

Involve the union early: A joint management-union effort is critical to work redesign success. See that the contract contains clauses for work redesign process or for a good quality of work life.

Don't expect the union to trust you at the start. Your motives will always be suspect. Try to understand the union as a political organization. Being elected is vastly different from being appointed.

Sometimes a limited objective is best. A "joint exploration" allows the union to provide input in defining goals, rather than merely participating in a program you have deviced to reach goals important to you. Of course, early involvement of the union creates problems with middle and line managers. But the union will doubt your sincerity if asked in late.

Job security is a key issue for the union. Some managements would guarantee that no employees will lose their jobs as a result of work redesign activity. Get your position clear on this issue early in the process.

What do you do if the union says no? This has to be assessed on an individual basis, although the common ingredients are the values, experience, and commitment usually of a key manager.

2. Implementing the Work Redesign Process

Work redesign is systemic: it takes what is in place in the environment (the demands on the organization) makes an analysis, sets goals (a desired future state), then makes changes in the system to bring it in line with the future state. Work redesign has been implemented with

success in different companies, but you cannot take a piece out of one context, apply it to another, and expect success. Don't copy.

Create a plan and structure: Work redesign, as mentioned, is a long process. Time is crucial. My opinion is that strategic planning is the best help in preparing yourself for change. (See Ansoff, H. J., [Refs. 71, 72]; Collier, J. T. [Ref. 73]; Drucker, P. F. [Ref. 74]; Lindblom, C. E. [Refs. 75, 76]; Lorange, P. [Refs. 77, 78]; Steiner, G. A. [Refs. 79, 80, 81, 82]; Stoner, James A. F. [Ref. 83]; Strickland, A. J. and Thompson, A. A. [Ref. 84].)

Participation is crucial to success. Involve all levels in analyzing what things are like today and how they got that way (present). Then, encourage and permit broad participation in defining a desired future state; that is, the kind of work place your organization wants to be. Next, encourage broad participation in working out the necessary changes (transition period) to move the organization toward the desired state. (For a selection on desired change techniques, see for example Stephen R. Michael et al, Techniques of Organization Change, McGraw-Hill Book Co, 1981 and Linda S. Ackerman, "Transition Management: An In-Depth Look at Managing Complex Change," Organizational Dynamics, Summer 82.) and for a more comprehensive analysis see Beckhard and Harris, Organizational Transitions; Managing Complex Change, Addison-Wesley, 1977.

The typical bureaucratic structure in both management and the union does not lend itself to such a process. Usually an extra structure is required. This structure will consist of a committee consisting of staff members of the organization and representatives from the union(s) at the site.

Besides the committee you should create search or analysis groups (task forces, core groups) to carry out a sociotechnical investigation (see below).

Write a clear and explicit charter for the basic force. The group will feel under pressure to get something done right away to show that it is effective; thus it may be tempted to offer piecemeal recommendations. What is really wanted in work redesign, however, is a comprehensive and thorough analysis leading to a recommendation to local union and management. Communicate this charter to the entire organization; otherwise you would expect that task force members will come under a lot of pressure. Even with communication, pressures will develop.

Adopt a sociotechnical approach: Although there are many approaches one can take, I believe that the sociotechnical approach is most likely to achieve and to sustain success. A systems approach like this would avoid one-sided solutions (that is to say sub-optimalization).

Broadly stated, this process answers six key questions:

(1) What does the technical system need from people in order to run well?

(2) What does a social system (people) require from a technical system (work) in order to meet people's needs (healthy quality of work life)?

(3) How well are people meeting the needs of the technical system?

(4) How well does the technical system meet the needs of the people?

(5) What changes in these two systems (social and technical) would improve conditions in both?

(6) What must be done to bring about these changes?

Question One requires a thorough and painstaking analysis. Valuable information is uncovered in the process. Managers, engineers and workers usually discover how much they do not know about their process-

Question Two involves behavior theory, introspection and exposure of personal values.

Question Three is a way to deal with realities of worker behavior in an atmosphere of reduced emotion, stereotyped thinking, defensiveness and fear of retribution.

Question Four is first considered by the task force. Using the criteria for a "good job" developed in Question Two, the task force analyzes each job and identifies where each needs improvement.

Question Five is the recommendation by the task force. The recommendation may be a radical or modest redesign.

In the mode of working to be applied if job enrichment and the like are considered, we have to embody Nadler's Purposes-Target-Results approach or I.D.E.A.L.S. Concept. [Ref. 85]. Distinctive of this approach are that in the investigation of contemplated and present work systems, consideration is given to all distinguished-eight-categories of system elements and their five 'dimensions' and that the following ten 'steps' are utilized:

(1) Problem definition.

(2) Generation of creative "ideal" extreme solutions for achieving the formulated purpose.

(3 - 5) Data collection (with as a point of departure the generated "ideal" solutions) development of alternatives and selection of workable solutions.

(6 - 8) Formulation of details and review of the plan.

(9) Implementation of the plan.

(10) Evaluation.

Typical of Nadler's concept are the careful formulating of the purpose and the limits of the system and of possible "boundary conditions" (Step (1)), and the generation of "ideal" solutions (Step (2)) as a basis for the design of the plan (Steps (4-8)).

In the method which we are applying as part of Step (1), a brief analysis is carried out by a small work group (committee) which concerns:

(1) Characteristics of the present task and work situations.

(2) Possibly desirable investments and organizational measures (in case of job enrichment).

(3) Probable future "protection" levels (including thier possible variability).

(4) Opinions of employees regarding changes in tasks and work situations (unions).

More extensive data are collected as part of Steps (2) and (3) concerning:

(1) Task characteristics and work loads.

(2) Work situations, including work places, working conditions, and organizational and social aspects.

(3) The persons involved, including their opinions about their tasks, their job satisfaction, work motivation and growth needs, absenteeism and turnover.

(4) The relative subsystem: it's purpose, organizational structure, etc.

Among the "instruments" employed for this purpose are:

(1) The Job Attribute Measurement Questionnaire, which mostly is filled up by an industrial engineer and

furnishes the RTA Index Scores, and Task Identity Index Scores (Turner and Lawrence [Ref. 53]). Of this instrument use is made to get information in Step (3) (about original tasks), Step (5) (about the future tasks) and Step (10) (about implemented tasks).

(2) The JDS (Job Diagnostic Survey) according to Hackman and Oldham [Ref. 56]. The questionnaires are filled out (Step (2) or (3)) by the performers of the tasks and by their bosses and in this way data are obtained regarding the conception held by them about the tasks (six 'core job dimensions'), work motivation, job satisfaction and growth needs.

Completion of the questionnaires is followed by a group discussion about desirable changes, possibly with 'brainstorming.' The next stage is 'data feedback' combined with nearer discussion of possible improvements (Stages (3 - 4).

The JDS questionnaire is used for the second time in the last phase (Steps (9 - 10)) as one of the sources of data for the purpose of the evaluation of the achieved alterations.

The use of different 'instruments' may be one for putting different teams and can be found in Walter R. Mahler, Diagnostic Studies, Addison-Wesley, Ontario, 1974).

3. Sustaining the Change

A major sustaining force comes from establishing goals that union leadership sees as worthwhile; namely, safety, quality of work life, job security. When these are present, you can expect active involvement so vital to sustenance. Passive acquiescence is not good enough! Even so, stewards at election time will find opponents running on an anti-quality-of-work-life platform.

Managers, consultants, union officials must be sensitive to the heat put on steward, worker, and supervisor task force members by their peers. Results are expected immediately. "You are weakening the union," "you are taking away our seniority rights," "you are eliminating our jobs."

More communication with the total organization is better than less, but keep your expectations within bounds. Work redesign cannot be explained in ten words or less. Work redesign is an "unsettling process." Don't expect it to be smooth sailing from day one.

G. SUMMARY

In this chapter we have described and presented some "models" of the process of work redesign and a method of guiding the managers to make it happen. It is hoped that this way will prove useful to managers as tools to guide practical innovations, as well as enhancing subsequent theoretical development.

However, it must be recognized that, although job redesign may jointly optimize the quality of working life of employees and the needs and goals of the organization, it is not without its problems. In particular, the implementation of change within organizations is extremely difficult, time consuming and requires large investments of resources. Moreover, the effects of job redesign are systemic and multiaviate, and hence difficult to predict, control and investigate. And finally, the costs and benefits resulting from the exercise may be unevenly distributed throughout the organizational system.

VI. CONCLUSIONS

Despite the recent popularity of work redesign as a research topic and change technique, many unanswered questions remain, especially regarding the application of work design principles in complex, ambiguous organizational situations.

This thesis only scratches the surface of the subject. Several questions must find an answer such as:

What is at a "bottom line" estimate of the cost and benefits of job changes?

What is the measure of production quantity of labor cost as measure of the effects of work redesign?

What is the ultimate cost of poor quality of work or "extra" supervisory time (absenteeism, soldiering, sabotage)?

Is work redesign paying off?

Even more the thesis says little about the patience and energy required, or the pitfalls. It is like we are standing on a hilltop (the present) and we want to reach another hilltop (the future). Between the two hilltops there is a dense fog. We have no map and we must proceed with caution to find a path that will lead to the other hilltop. That path is difficult to find. It appears, therefore, that building systematic understanding about the process of installing and

supporting changes in the design of work may require some significant innovations in organizational research methodologies. Perhaps, for example, ways can be found to collect and report data from case studies so that they can be combined to build trustworthy and cumulative bodies of knowledge. Or perhaps certain techniques could be formulated to the study of change in organizations.

I can't see at present what methodological innovations will be developed and be found useful. But it seems that some such innovations will be required to generate research finding about work redesign that are more practically usefu. than those I analyzed and we have at present.

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